

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A proportional rotary torquer for a valve, the proportional rotary torquer comprising:
a stator having pluraltwo permanent magnets; and
a rotor having a rotor core which pluraltwo salient poles are formed at, and
one or more rotor coils are wound around;
wherein an electric current is supplied via a wire to the rotor coils, so that a
relative angle position of the rotor and the stator is displaced;
wherein the permanent magnet has two circumferential end portions and one
circumferential center portion, and the radial thickness of the
circumferential end portion is from 90% to 95% of the radial thickness
of the circumferential center portion;
wherein the distance from the radial outline of the center portion of each of the
salient pole to the rotation center of the rotor core is not more than 99%
of the distance from the radial outline of the circumferential end portion
of each of the salient pole to the rotation center of the rotor core; and
wherein the angle between the line connecting one of the circumferential
outlines of the salient pole and the rotation center of the rotor core and
the line connecting the other circumferential outline of the same salient
pole and the rotation center of the rotor core is not less than 100
degrees.

2. (Original) A proportional rotary torquer according to claim 1, wherein the proportional rotary torquer is structured such that:
 - the radial thickness of the permanent magnet at the circumferential end portions being smaller than the radial thickness of the permanent magnet at the circumferential center portion;
 - the distance from the radial outline of the center portion of the salient pole to the rotation center of the rotor core being smaller than the distance from the radial outline of the circumferential end portions of the salient pole to the rotation center of the rotor core; and
 - the angle between the line connecting one of circumferential outlines of the salient pole and the rotation center of the rotor core and the line connecting the other circumferential outline of the same salient pole and the rotation center of the rotor core being an obtuse angle.
3. (Original) A proportional rotary torquer according to claim 1, wherein the rotor core and the permanent magnet have facing surfaces facing each other, the facing surfaces of the rotor core and the permanent magnet formed in the shapes of the circular arc surfaces of which center positions are different from each other.
4. (Original) A proportional rotary torquer according to claim 1, wherein the permanent magnet has a facing surface facing the rotor core, the facing surface formed in the shape of an elliptical surface.
5. (Original) A proportional rotary torquer according to claim 1, wherein the permanent magnet has a facing surface facing the rotor core, the facing surface at the circumferential end portion formed in the shape of a flat-cut surface.

6. (Original) A proportional rotary torquer according to claim 1, wherein the rotor core has two facing surfaces respectively facing the two permanent magnets, each of the facing surfaces of the rotor core formed in the shapes of a plurality of circular arc surfaces of which center positions are different from each other.
7. (Original) A proportional rotary torquer according to claim 1, wherein the rotor core has two facing surfaces respectively facing the two permanent magnets, each of the facing surfaces formed in the shape of an elliptical surface.
8. (Original) A proportional rotary torquer according to claim 1, wherein the rotor core has two facing surfaces respectively facing the two permanent magnets, the facing surface at the circumferential end portion of the salient pole formed in the shape of a flat-cut surface.
9. (Original) A proportional rotary torquer according to claim 1, wherein the permanent magnet has two circumferential end portions, each of which has a non-magnetized region formed thereat.
10. (Original) A proportional rotary torquer according to claim 1, wherein the proportional rotary torquer further comprises one or more elastic members generating the torque at the magnitude proportional to the angular displacement of the rotor and in the direction opposite to the rotation direction of the rotor.